Pneumothorax—A Medical Emergency

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ABSTRACT: A traumatic pneumothorax (collapsed lung) can be a life-threatening injury if it is not recognized and treated immediately. An 18-year-old high school athlete wearing rib protection sustained a pneumothorax while playing varsity football. On-site evaluation raised suspicions that the injury could be more than a rib contusion. Further examination by the team physician suggested a possible rib fracture and pneumothorax. The athlete was transported by ambulance to the hospital for x-rays and confirmation of the physician's diagnosis. The athlete was hospitalized for 2 weeks and upon release was allowed to return to school with restricted activity. This article alerts the athletic trainer to an infrequent but serious injury and discusses the signs, symptoms, and basic care instructions for a suspected pneumothorax.

Pneumothorax refers to the presence of air between the visceral and the parietal pleura of the pleural cavity.[1,2,4,5] This injury is commonly known as a collapsed lung. Although the etiology of a pneumothorax can vary, the two most common types are traumatic and spontaneous.[3] A traumatic pneumothorax is caused by a penetrating wound to the chest such as a stab wound, or a fractured rib which violates the visceral pleura (a thin sheet of collagen and elastic tissue that encases each lung).[4,7–9] A spontaneous pneumothorax is the term used to designate a sudden, unexpected pneumothorax which may occur with or without underlying disease.[9] Pulmonary diseases that may cause a spontaneous pneumothorax include asthma, cystic fibrosis, emphysema, and pneumonia.[4,5,7,8] This paper focuses on a traumatic closed pneumothorax. Our objective is to alert the reader to this infrequent injury that can be potentially life-threatening to an athlete if it is not recognized and treated immediately.

CASE REPORT

An 18-year-old male wide receiver was injured during a varsity high school football game. The injury was sustained when the athlete caught a pass and was hit by the defender on the right side of the chest wall. At the time of the injury, the athlete was wearing a recommended rib vest for protection (Rawlings GB Rib Vest; Rawlings Sporting Goods Co, St Louis, MO). After catching the pass, he was able to "bounce off" the initial hit to his right thorax and run for an additional 5 yards before being tackled. Once tackled, the athlete removed himself from the game without assistance, explaining he felt like "the wind had been knocked from him."

In the initial examination, the athlete indicated that he had no pain but a general soreness in the right side of his chest and was having "a hard time breathing." Ice was provided to the injury site and he was told that he would be observed and re-examined before being allowed to play. After several minutes, he started to complain of increasing pain, difficulty in breathing, a feeling of lightheadedness, and not being able to sit up straight without pain. At this time, he was examined by the team physician who removed the athlete from the sideline into the locker room. The locker room examination by the team physician included a history and physical examination of the injury site. This examination included auscultation, percussion, and observation of the athlete's breathing. The diagnosis by the team physician was of a possible fractured rib and punctured right lung. The athlete was immediately transported by ambulance to the hospital where the diagnosis was confirmed with a chest x-ray and examination by the emergency room physician. The traumatic closed pneumothorax was caused by a fractured right 5th rib which lacerated the visceral pleura.[4]

The athlete was admitted to the hospital and underwent a thoracostomy and insertion of a chest tube. A thoracostomy is a surgical procedure in which an incision of the chest wall is made, with maintenance of the opening for drainage.[6] The chest tube was used to inflate the lung and for drainage of the pleural cavity. The athlete was hospitalized for 12 days and placed on antibiotics for an additional 2 weeks. Since this was the last football game of the season, the athlete did not return to play but made a full recovery.

DISCUSSION

If not recognized and treated immediately, a large pneumothorax could be fatal.[4] If left untreated, a pneumothorax results in a collapse of the lung tissue which may cause a mediastinal shift.[5,7] This mediastinal shift causes the collapsed lung to be pressed against the uninjured lung and heart resulting in a reduction of their functioning capacity and possible failure. A pneumothorax could also result in a tracheobronchial fracture or an esophageal rupture, which could have potentially fatal complications.[4] It should also be noted that, in many cases of chest trauma, a pneumothorax results even though there are no broken ribs. Finally, an untreated pneumothorax could cause severe dyspnea, shock, life-threatening respiratory failure, and/or circulatory collapse.[1]

A suspected traumatic pneumothorax can lead to the rapid deterioration in an athlete's breathing and alter other vital body signs. Signs and symptoms are given in Table 1. It is important that the athletic trainer be familiar with these signs and symptoms, and not dismiss any injury complaint without a thorough examination. If a pneumothorax is suspected, the athletic trainer should follow specific care guidelines (Table 2).

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Table 1. Signs and Symptoms of a Pneumothorax

Sudden sharp chest pain
Dyspnea
Shortness of breath
Occasionally, a dry, hacking cough on onset
Pain, which may be referred to the corresponding shoulder, across the chest, or over the abdomen
Lightheadedness
Tightness in chest
Decreased or absent breath sounds over the collapsed lung
Cessation of normal chest movements on the affected side
Fall in blood pressure
Tachycardia

Table 2. Care for a Suspected Pneumothorax

Keep the athlete quiet and calm.
Place the athlete in a sitting position.
Have the athlete try to control coughing and gasping.
Do not give fluids to the athlete.
Immediately transport the athlete to a medical facility for x-rays.

Besides the obvious medical considerations this injury presents, it also demonstrates the importance of communication between the athlete, athletic trainer, and team physician. The athletic trainer–student athlete relationship is unique and evolves over time by building on open communication and trust. This communication and trust is important in an injury evaluation and cannot be established by part-time medical coverage or coverage that varies or changes from year to year. When evaluating an injury, identify the obvious complaints but listen and suspect all other possibilities. For what at first might seem like a routine injury could in fact be a medical emergency. Know your athletes; listen to how they describe their injuries; be suspicious; err on the side of caution; and observe them for any other possible injury considerations.

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